

History of Science 512: Galileo Galilei: Life, Writings, and Interpretations
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Tuesdays and Thursdays 9:30-10:45 a.m. in 6102 Social Science Building.
The format combines lectures with discussion
Office hours: T 2:00-3:30 (Bradley Memorial 326) and by appointment
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Required Books

Galileo on the World Systems: A New Abridged Translation and Guide, trans and ed. by Maurice Finocchiaro (Berkeley: U. of California Press, 1997).
Richard J. Blackwell, Galileo, Bellarmine, and the Bible (Notre Dame: U. of Notre Dame Press, 1987).
Stillman Drake, trans., Discoveries and Opinions of Galileo (Anchor, 1957).
Maurice Finocchiaro, ed., The Galileo Affair (Berkeley: U. of California Press, 1989).
Dava Sobel, Galileo's Daughter: A Historical Memoir of Science, Faith, and Love (New York: Penguin, 1999).
Ernan McMullin, ed., The Church and Galileo (Notre Dame: U. of Notre Dame Press 2005).

Also required is the book by Stillman Drake, Galileo at Work: His Scientific Biography [1978] (New York: Dover, 1995), currently out of print. If you cannot find your own used copy, a photocopy is available for \$18; the course reader is also available for \$11 in 7143 Social Science, 8 a.m.-3 p.m. (NOTE: **there are no refunds for either of these course packets if you drop the course**). All articles are in the reader, almost all in order of appearance.
There will be an occasional handout to be read (perhaps drafts of one of my forthcoming book project?).

A good reference for the conceptual history of physics and astronomy during the Scientific Revolution is I. Bernard Cohen, The Birth of a New Physics (Norton). A reliable website is The Galileo Project (started by Al van Helden) at Rice University: <http://es.rice.edu/ES/humsoc/Galileo/>

Requirements

The course is a kind of "conference course," a format combining lecture and discussion (in variable proportion).

Reading the assigned selections before class is very important, as is oral participation by way of informed questions and comments.

A one-page evaluative and analytical "reader's response" paper will be due in class for almost every week in which you are handing in no other writing assignment. This weekly assignment is meant (1) to stimulate your thinking and your ability to contribute to the discussion; (2) to give me feedback on areas that you find problematic; (3) to keep you thinking and writing (the two activities go together). (These papers will be marked sat/unsat; after the first few weeks, they may not necessarily be marked or returned every week). See hand-out.

Undergraduates:

In-class participation and one-page "reader's response" papers (15%), due in class by Wednesday at the latest.

Two of the three analytical papers listed (5 pp. each): 10% each (due in the relevant class period).

Take-home midterm essay (20%)--**due 10/22**

Review of Dava Sobel, Galileo's Daughter (5 pp.)--**due 11/24** (15%).

Final (with review questions) (30%) **12/19/09 at 2:45**

Extra-credit options available (including rewriting the midterm, writing a additional analytical paper, doing a special reading assignment, etc). Honors projects may include observation projects, in-class reports, as well more traditional work.

Grad students:

The above, excluding exams. In addition:

One research paper (15 pages min.; 40%; due by the last day of class) **or** two critical essay-reviews (5-8 pp. each) of substantive books on Galileo or his context (20% each). The first due by the midterm; the second due by the final. Talk to me about this at an early date!

One 15 min. presentation to the class, including a 1-page handout (10%)--an exercise in teaching; clarity and intelligibility are at a premium (topic suggestions appear below, nearly week by week)

I expect scrupulous academic honesty in the course and otherwise. All written work should be your own in concept and execution. Use quotation marks to distinguish the words of others from your own; give credit to the sources of your ideas. If you are unsure about proper citation practice, talk to me about it (in person, by phone, or by email).

Reference: note the chronology in The Galileo Affair (297-312) and the helpful casts of characters in ibid (313-324) and Galileo at Work, 437-471.

Schedule

Week 1: Introduction to course/sixteenth-century background

Th 9/3: Introduction to course and early astronomy and its context

Readings: Galileo on the World Systems, pp. 1-38.

Recommended for general background (HS Reading Room and UW libraries): Thomas Kuhn, The Copernican Revolution, ch. 1-4; I. B. Cohen, The Birth of A New Physics; S. Drake, Galileo Galilei (Oxford/Hill and Wang); L. Geymonat, Galileo Galilei: A Biography and Inquiry into his Philosophy of Science.

Week 2: The early Galileo and his context

T 9/8: Drake, "Vincenzio Galilei and Galileo," Galileo Studies, pp. 43-62; Tim Carter, "Music and Patronage in Late Sixteenth-Century Florence: The Case of Jacopo Corsi, (1561-1602)" in I Tatti Studies: Essays in the Renaissance 1 (1985) 57-79 (skim notes and appendices); Lerner, "The Heliocentric 'Heresy'," pp. 11-18 (first part) and Shank, "Setting the Stage," (first part) pp. 57-69 in McMullin, ed., The Church and Galileo.

Th 9/10: Blackwell, Galileo, Bellarmine, ch. 1, Appendices 1-3, pp. 5-27, 181-194;

Drake, Galileo at Work, ch. 1-2, pp. 1-32.

One-pager due.

Possible grad report on Vincenzo Galilei and music, using the work of Claude Palisca and translations of V. Galilei's works.

Week 3: The Science of motion to the early Galileo

T 9/15: Lindberg, Beginnings of Western Science, pp. 290-307; Galileo at Work, ch. 3-5, pp. 33-90.

Th 9/17: "Comrades in Pursuit of Truth," pp. 597-600; Koyré, "Galileo and Plato," from his Metaphysics and Measurement (Harvard UP, 1968); Galileo at Work, ch. 6-7, pp. 91-133. Guest or alternate meeting.

One-pager due.

Possible grad reports on William Wallace's work, the Wallace-Crombie scuffle etc; Lane Cooper on Galileo and the Leaning Tower; Galileo and astrology (articles by Righini; N. Kollerstrom; D. Rutkin in Galileiana 2 (2005) 107-43; N. Swerdlow in JHA)

Week 4: Galileo and the spyglass, 1610

T 9/22: Skim the intro to Discoveries and Opinions (1-19) and read "Starry Messenger" (1610), pp. 23-58.

Th 9/24: Westfall, "Scientific Patronage: Galileo and the Telescope," Isis 76 (1985) 11-30; Biagioli, "Galileo the Emblem-maker," Isis 81 (1990) 230-258; Shank, "Galileo's Day in Court," Journal of the History of Astronomy 25 (1994) 236-242; Drake, Galileo at Work, ch. 8-9, pp. 134-176.

One-pager due, or analytical paper #1: Dedication of "Starry Messenger," in Drake, D&O, pp. 23-26.

Possible grad reports: Galileo as instrument maker; the telescope and its antecedents; the Biagioli-Shank controversy (Biagioli, "Playing with the Evidence," and Shank, "How Shall We Practice History: The Case of Biagioli's Galileo, Courtier," Early Science and Medicine 1 (1996) 69-150.)

Week 5: Galilean controversies, 1613

T 9/29: "Letters on Sunspots" (1613) in Drake, D&O, pp. 89-144 (skim the intro, pp. 59-85); Galileo at Work, ch. 10-11, pp. 177-213.

Th 10/1: Castelli's 1613 letter to Galileo in Finocchiaro, Galileo Affair, pp. 47-48; "Letter to Castelli" (1613), in either Finocchiaro (pp. 48-54) or Blackwell (pp. 195-201); Blackwell, chap. 3; Kelter, "Refusal to Accommodate," in McMullin, ed., The Church and Galileo, pp. 39-53; Drake, Galileo at Work, ch. 12, pp. 214-230.

One-pager due, or analytical paper #2: the Letter to Castelli

Possible grad reports: "Dispute over Bodies in Water" (see Drake, "Dispute over Bodies in Water," Galileo Studies, 159-176); Drake, Cause, Experiment and Science: only introduction and red print (=Galileo's "Bodies that Stay atop Water or Move in it") are required (odd to say, the "dialogue" was composed by Drake!).

Week 6: Natural philosophy and religious knowledge

T 10/6: Blackwell, chap. 4, pp. 87-110, and Appendices 5-9, pp. 203-276 (includes Foscarini's Letter); Finocchiaro, Galileo Affair, pp. 70-86; Drake, Galileo at Work, ch. 14, pp. 252-266.

Th 10/8: Read introduction to "Letter to Grand Duchess Christina" (1615) in Drake, D&O, pp. 145-71; Blackwell, ch. 2-3, pp. 29-85; McMullin, "Galileo's Theological Venture," in McMullin, ed., The Church and Galileo, ch. 4, pp. 88-116; Drake, Galileo at Work, ch. 13, pp. 231-251.

One-pager due.

Possible report: different approaches to the "Letter to the Grand Duchess" (de Santillana, Langford, Blackwell, Westfall, etc).

Week 7: Galileo admonished, 1616

T 10/13: Read for discussion "Letter to Grand Duchess Christina" in Finocchiaro, Galileo Affair, pp. 87-118 [**not** in Discoveries and Opinions (145-216)--Drake's translation is poorer). Begin reading for Wednesday.

Th 10/15: Galileo on the World Systems, pp. 38-43; Finocchiaro, The Galileo Affair, pp. 119-133 (Discourse on tides, 1616) and "Earlier Inquisition Proceedings," pp. 134-153; Blackwell, chap. 5, pp. 111-134; Fantoli, Part 1 of "The Disputed Injunction" (pp. 117-26) and McMullin, "The Church's Ban," (pp. 150-90) in McMullin, ed., The Church and Galileo; Drake, Galileo at Work, ch. 14, pp. 252-266.

One-pager due. Example of extra credit option: analytical paper on the "Letter to the Grand Duchess," in Finocchiaro, The Galileo Affair, pp. 90 ("Now...") to 96 (...necessary demonstrations." 10 lines from the bottom).

Possible report: Bellarmine's Louvain Lectures (ed. U. Baldini and G. V. Coyne (Studi Galileani, vol. 1, #2, Vatican City, 1984); different approaches to the 1616 admonition (Santillana vs. Drake in appendix to Geymonat; Redondi; Fantoli; Feldhay; etc)

Week 8: Galileo on comets—and Copernicus?

T 10/20: Galileo, "Letter to Archduke Leopold," (1618) and Corrections of Copernicus in Finocchiaro, The Galileo Affair, pp. 198-202; excerpts from The Assayer (D&O, 217-281); Drake, Galileo at Work, ch. 15, pp. 267-289.

Th 10/22: Galileo, "Reply to Ingoli" (1624) in Finocchiaro, The Galileo Affair, 154-197; plus the anonymous complaint ("G3") and Guiducci's 1625 letter to Galileo, pp. 202-206; Drake, Galileo at Work, ch. 16, pp. 289-305.

No one-pager due; mid-term essay due 10/22; first review due for grad students

Possible grad report: The Redondi thesis (Galileo, Heretic) and Westfall's response (in his Essays on the Trial of Galileo).

Week 9: Galileo's Dialogue (1632) I: change in the heavens?

T 10/27: Galileo on World Systems, "To the Discerning Reader," and Day One, pp. 77-116 including the explanatory notes; Drake, Galileo at Work, ch. 17, pp. 306-329.

Th 10/29: Galileo on World Systems, Day Two, pp. 117-170 including the explanatory notes.

One-pager due, or analytical paper #3: Day 2, fourth argument, pp. 155-165 top.

Possible grad reports: Galileo as epistemological anarchist (Paul Feyerabend's Against Method with response by Peter Machamer), or as empiricist (S. Drake), or as a smart Aristotelian (William Wallace)

Week 10: Galileo's Dialogue (1632) II: Might the Earth rotate?

T 11/3: Galileo on World Systems, Day Two, pp. 171-220 including the explanatory notes; Drake, Galileo at Work, ch. 18, pp. 330-352.

Th 11/5: Sobel, Galileo's Daughter, Parts 1-2 (to p. 183)—take good notes (see Tuesday 11/24!)—possible guest discussion.

One-pager due by email.

Week 11: Galileo's Dialogue (1632) III—annual motion and tides?

T 11/10: Galileo on World Systems, Day Three, pp. 221-81.

Th 11/12: Galileo on World Systems, Day Four, pp. 282-308 including the explanatory notes; Drake, Galileo at Work, ch. 19, pp. 353-372.

One-pager due.

Week 12: Galileo in Trouble

T 11/17: Beretta, "The Documents in Galileo's Trial," in McMullin, ed., The Church and Galileo, ch. 7, pp. 191-212; Trial documents in Finocchiaro, ed., The Galileo Affair, pp. 206-255.

Th 11/19: Sobel, Galileo's Daughter, parts 3-4, pp. 187-281 (discussion)

One-pager due.

Possible grad reports on books by Fantoli or Feldhay

Week 13: Galileo and his daughter

T 11/24: Finish Sobel, Galileo's Daughter (discussion)

Review of Sobel due in class.

[Th 11/26: Thanksgiving—no class]

Possible grad report: background to Sobel; relation of all letters to the book

Week 14: Galileo and the Roman Inquisition (1633)

T 12/1: Fantoli, Part 2 of "The Disputed Injunction" McMullin, ed., The Church and Galileo, pp. 126-43; Finocchiaro, ed., The Galileo Affair, pp. 256-293.

Th 12/3: Finish Shank, "Setting the Stage," in McMullin ed., The Church and Galileo, pp. 69-81; D. P. Walker, Spiritual and Demonic Magic from Ficino to Campanella (Notre Dame, 1958; 1969), pp. 203-212; Heilbron, "Censorship of Astronomy...." in McMullin, ed., The Church and Galileo, ch. 11, pp. 279-322.

One-pager due.

Possible grad reports: Brecht's Life of Galileo Galilei; Shea and Artigas on the trial.

Week 15: Galileo's mature mechanics

T 12/8: Review Cohen, "Toward an Inertial Physics;" Galileo Galilei, Two New Sciences (Drake transl.), Day 3 (pp. 153-170); Drake, Galileo at Work, ch. 20-21, pp. 373-412.

Th 12/10: Galileo Galilei, Two New Sciences (Drake transl.), Day 4 (217-229); Drake, Galileo at Work, ch. 22, pp. 413-36.

One-pager due.

Possible grad reports: specific elements of Two New Sciences; Finocchiaro's Retrying Galileo, 1633-1992 (forthcoming)

Week 16: Summation

T 12/15: Overview

Final Exam: 12/19/2009 at 2:45 p.m.

Galileo course: Guidelines for the one-page papers

The following guidelines seek to clarify my expectations for the one-page response paper and amplify what I said about them orally.

The purposes of these papers are several:

- 1) to help you read the assignments carefully, critically, and in advance;
- 2) to help you commit yourself in writing to a point of view on a topic worthy of discussion in class (i.e., this is a resource for your class participation)
- 3) to get beneath the surface of the assigned texts by ferreting out/analyzing/amplifying an issue/theme or two that you consider significant.

I hope that, as a matter of course, you are drawing connections between the texts we are reading and the rest of your knowledge. In these papers, however, I expect you to **focus on the readings** and to be analytical and critical when reflecting on them. By “analytical,” I mean that you are thinking about the way in which the author is constructing an argument, trying to persuade a reader, or refuting an opponent. You are paying attention to the parts of the arguments, to the strategies of the writer, and to their effectiveness. By “critical,” I do not mean “disapproving” or “negative,” but rather the attempt to get under the surface of a text and beyond the appearances.

Here are a few examples of what you might do. Think about what the text reveals (or hides), including the text’s hidden assumptions. Think about successful as well as flawed arguments. Think about the author’s intended audience (and perhaps his unintended ones as well). Think about the possible differences between what we see in a source, and what a contemporary of Galileo might have seen in it. If you find a line of reasoning persuasive, ask yourself why it persuades you (similarly for the unpersuasive). Read between the lines, and give reasons for your reading. The preceding advice goes for both primary materials (the writings of Galileo and his contemporaries) and, when applicable, to secondary sources as well (the writings of historians and other interpreters).

Your focus may be a significant point of detail, or the larger thesis of one of the reading assignments, or many issues between these extremes. While this choice is a matter of taste, I suggest that, when in doubt, you go for the specific (and more manageable) rather than the general point. The one-page requirement will severely limit your ability to defend a grand thesis convincingly. This is not a dissertation.

I am not interested in either a mere summary, or what you take to be obvious points, or editorializing about current issues, or stimuli to your memory (“Galileo’s point reminds me of an anecdote about science and religion that my high school history teacher used to tell...”). I am much more interested in seeing you explain your excitement about a new insight into the seventeenth century, deal with something unexpected, confront a puzzle, or articulate a problem clearly (even one that you cannot yet solve). Setting up a problem clearly is often the most valuable contribution to a future solution. Admissions of ignorance are fine, but you should follow them with signs of intellectual struggle—e.g., attempted solutions, and reasons why they do not seem satisfactory. I hope that, on more than one occasion, the readings for a later week will help you solve the puzzle of an earlier week’s assignment. I am happy to hear about such insights; if they tie in to the current week’s readings, they are appropriate topics for the current week’s one-page paper as well.

It should be obvious that these skills will serve you well in many future endeavors that have nothing to do with Galileo, from the reading of contracts to the analysis of news reports to the decoding of love letters, to say nothing of the readings in your other courses.

Let me know (in class or via mhshank@wisc.edu) if you have remaining questions .